

REMARKS

Initially, Applicants would like to express appreciation to the Examiner for the detailed Final Official Action provided.

However, Applicants note that the Examiner has not acknowledged Applicants' Claim for Priority and receipt of the certified copy of the priority document. It is noted that the Patent Application Information Retrieval (PAIR) system on the U.S. Patent and Trademark Office website reflects Applicants' Claim for Priority in the instant application. Accordingly, the Examiner is requested to acknowledge receipt of Applicants' Claim for Priority and receipt of the certified copy of the priority document in the next Official Action.

Upon entry of the above amendment, claim 1 will have been amended. Accordingly, claims 1-4 are currently pending. Applicants respectfully request reconsideration of the outstanding rejection and allowance of claims 1-4 in the present application. Such action is respectfully requested and is now believed to be appropriate and proper.

The Examiner has rejected claims 1-4 under 35 U.S.C. § 103(a) as being unpatentable over INOUE et al. (U.S. Patent Appl. Pub. No. 2003/0157404) in view of KAGEYAMA (U.S. Patent Appl. Pub. No. 2001/0006746) and ENDO (JP 2001-155698).

Although Applicants do not necessarily agree with the Examiner's rejection of claim 1 on this ground, nevertheless, Applicants have amended independent claim 1 to clearly obviate the above noted ground of rejection in order to expedite prosecution of the present application. In this regard, Applicants note that INOUE et al., KAGEYAMA, and ENDO fail to teach or suggest the subject matter claimed in amended claim 1. In particular, claim 1, as amended, sets forth a generally oval battery including, inter alia, "a battery case having a generally oval cross section, a generally oval

sealing plate including a pair of linear parts opposite each other and a pair of circular parts opposite each other forming a generally oval shape and forming four locations where the linear parts join the circular parts and the shape of the sealing plate changes from a circular part to a linear part and from a linear part to a circular part, and an electrode plate assembly, said sealing plate having a U-shaped cross section, and said battery having a thickness of 4mm or more and an aspect ratio of 3 or more, wherein the four locations where the shape of the battery case changes from a circular part to a linear part or from a linear part to a circular part in an interface between said battery case and the sealing plate act as points where breakage occurs for discharge of gas”.

This amendment is fully supported by the specification, including the claims and drawings, and no prohibited new matter has been added.

The present invention provides an explosion preventing battery including a discharge mechanism in which the weld between the sealing plate 3 and the battery case 2 selectively breaks at *four locations* where the shape of the battery case changes from the linear part 4 to the circular part 5 or from the circular part 5 to the linear part 4. In the present invention, *selective and predetermined* breakage at the particular *four locations* where the shape of the battery case changes from a linear part to a circular part or from a circular part to a linear part controls gas discharge and prevents explosion. The present invention includes *four breakage points*. Thus, the battery includes a breakage point at *each of the four locations* where the shape of the battery case changes from a linear part to a circular part and from a circular part to a linear part. See particularly figure 3. Accordingly, in Applicant’s claimed invention, the safety of the present invention is improved many times over the safety of the prior art devices. In particular, the safety of the present invention is improved four times over the safety of the prior art devices.

The inventors of the present invention have determined that, when the internal pressure in the battery case rises and the generally oval battery 1 is deformed into a shape as shown in figure 2, *the battery case 2 and the sealing plate 3 are deformed in different manners because of the correlation between the aspect ratio of the generally oval battery 1 and the battery thickness T.* Using this deformation of the battery case 2 and the sealing plate 3, *the weld is made to break from the four intersecting points between a circular part and a linear part, whereby a battery is obtained which easily lets out gas to the outside, without requiring expensive equipment or many processing steps.* Accordingly, the *combination* of the correlation between the aspect ratio and battery thickness, and the four intersecting points between a circular part and a linear part provides a superior battery. The superior battery provides controlled and predictable explosion prevention, thus providing improved safety. See particularly Tables 1-6; and page 6, line 10 through page 9, line 15. Accordingly, a superior battery with improved and unexpected features and results, is provided by Applicants' present invention.

In other words, the elements (*i.e.*, the correlation between the aspect ratio and battery thickness, and the four intersecting points) in combination work together to provide the superior resulting battery, and do not merely perform the function that each element performs separately. Additionally, the combination of the correlation between the aspect ratio and battery thickness, and the four intersecting points between a circular part and a linear part work together to provide the superior battery, and thus the combination provides unexpected results.

INOUE et al. teaches a battery having a generally oval sealing plate. As recognized by the Examiner, INOUE et al. fails to teach or suggest a breaking point located where the battery case

shape changes from circular to linear or from linear to circular. INOUE et al. also fails to teach or suggest a battery having a thickness of 4mm or more and an aspect ratio of 3 or more.

The KAGEYAMA publication teaches a flat, rectangular battery. KAGEYAMA also fails to teach or suggest a breaking point located where the battery case shape changes from circular to linear or from linear to circular in an interface between the battery case and the sealing plate.

ENDO is directed to a rectangular battery. As shown in the figures, the ENDO battery includes a rectangular sealing plate 2. Each of the corners of the rectangular sealing plate is gently curved between the respective long sides and shorter sides. As shown in the figures, the long sides and shorter sides of the rectangular sealing plate are linear portions. Since the corners are gently curved and the sides of the rectangle are linear, the sealing plate includes locations at which the shape of the sealing plate changes from curved (or substantially circular) to linear and from linear to circular. As shown particularly in figures 1 and 4, the locations of changing from circular to linear and from linear to circular are positioned at the points at which the corners and the sides meet. These locations are positioned precisely at the corners. For reference, see figure 4, the line A-A, which is positioned on an entirely linear portion. The locations of changing from circular to linear and from linear to circular are positioned closer to the corner than the line A-A. Any position along the long side of the sealing plate is an entirely linear portion. Thus, it is clear that any other location is *not* the location of changing from circular to linear and from linear to circular. At any location further from the corner than the line A-A, the shape has *already* changed to a linear portion.

The Examiner indicates that reference numeral 5 in figure 4 indicates a location where the shape of the battery case changes from circular to linear or from linear to circular, that acts as a breakage point. However, it is believed that *figure 4 clearly shows the indicated breakage point 5*

completely on a linear portion of the sealing plate. In this regard, even the line A-A is completely on a linear portion of the sealing plate. It cannot fairly be said that the point 5 is positioned at the location where the shape case changes from a circular part to a linear part or from a linear part to a circular part. Clearly, at the location of breakage point 5, the shape of the sealing plate is entirely linear.

Additionally, the Examiner has indicated that “figure 3 number 7 of applicant’s drawings show that the breakage point is also on the linear portion of the sealing plate”. However, in the present application, figures 3 and 7 clearly show that the breakage point 7 is located where the shape of the sealing plate changes from linear to circular and from circular to linear. Further, figure 7 shows the radius R of the circular portion, and the breakage point at the point where the shape of the sealing plate changes from a linear part to a circular part and from a circular part to a linear part. Thus, the Examiner has mischaracterized Applicants’ invention as showing the configuration of the prior art.

Additionally, the ENDO device includes a *single* breakage point 5. ENDO does not disclose, teach, or suggest any other configuration than a single breakage point. Certainly, ENDO clearly fails to teach or suggest four breakage points, as in Applicants’ claimed invention.

As described above, the present invention includes *four breakage points*, one at each point where the shape of the sealing plate changes from linear to circular and from circular to linear. When the internal pressure in the battery case rises, *the battery case 2 and the sealing plate 3 are deformed in different manners because of the correlation between the aspect ratio of the generally oval battery 1 and the battery thickness T.* The weld is made to break from the four intersecting

points between a circular part and a linear part, whereby a battery is obtained which easily lets out gas to the outside, without requiring expensive equipment or many processing steps.

Accordingly, the *combination* of the correlation between the aspect ratio and battery thickness, and the four intersecting points between a circular part and a linear part provides a superior battery. Accordingly, a superior battery with improved and unexpected features and results, is provided by Applicants' present invention.

Thus, the elements in combination work together to provide the superior resulting battery, and do not merely perform the function that each element performs separately. Additionally, the combination elements work together to provide the superior battery, and thus the combination provides unexpected results.

Therefore, the ENDO publication fails to cure the deficiencies of the INOUE et al. and KAGEYAMA devices, and even assuming, arguendo, that the teachings of INOUE et al., KAGEYAMA, and ENDO have been properly combined, Applicants' claimed generally oval battery including, inter alia, "a battery case having a generally oval cross section, a generally oval sealing plate including a pair of linear parts opposite each other and a pair of circular parts opposite each other forming a generally oval shape and forming four locations where the linear parts join the circular parts and the shape of the sealing plate changes from a circular part to a linear part and from a linear part to a circular part, and an electrode plate assembly, said sealing plate having a U-shaped cross section, and said battery having a thickness of 4mm or more and an aspect ratio of 3 or more, wherein the four locations where the shape of the battery case changes from a circular part to a linear part or from a linear part to a circular part in an interface between said battery case and the sealing

plate act as points where breakage occurs for discharge of gas” as set forth in amended claim 1 would not have resulted from the combined teachings thereof.

Moreover, there is nothing in the cited prior art that would lead one of ordinary skill in the art to make the modification suggested by the Examiner in the rejection of claim 1 under 35 U.S.C. § 103(a) over INOUE et al. in view of KAGEYAMA and ENDO. Thus, the only reason to combine the teachings of INOUE et al., KAGEYAMA and ENDO results from a review of Applicants’ disclosure and the application of impermissible hindsight.

Accordingly, the rejection of claim 1 under 35 U.S.C. § 103(a) over INOUE in view of KAGEYAMA and ENDO is improper for all the above reasons and withdrawal thereof is respectfully requested.

Applicants submit that dependent claims 2-4, which are at least patentable due to their dependency from claim 1 for the reasons noted above, recite additional features of the invention and are also separately patentable over the prior art of record based on the additionally recited features.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection, and an early indication of the allowance of claims 1-4.

SUMMARY AND CONCLUSION

In view of the foregoing, it is submitted that the proposed amendment is proper for entry since it merely combines clarifies the language describing the arrangement of the breakage points, which is an issue about which Applicants have already presented arguments and it is also submitted that none of the references of record, considered alone or in any proper combination thereof, anticipate or render obvious Applicants’ invention as recited in claims 1-4. The applied references of

record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

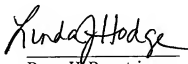
Accordingly, consideration of the present amendment, reconsideration of the outstanding Final Official Action, and allowance of the present amendment and all of the claims therein are respectfully requested and now believed to be appropriate.


Applicants have made a sincere effort to place the present application in condition for allowance and believe that they have now done so.

Any amendments to the claims which have been made in this amendment, which do not narrow the scope of the claims, and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered cosmetic in nature, and to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should there be any questions, the Examiner is invited to contact the undersigned at the below listed number.

Respectfully submitted,
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